

Date: Tuesday, 19/08/2008 11:21:39 AM  
 User: Julie LeCocq

## Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : 206L AFT X-TUBE  
 Job Number : 41393  
 Estimate Number : 10973  
 P.O. Number :  
 This Issue : 19/08/2008 S.O. No. :  
 Prsht Rev. : NC Part Number : D206667203  
 Drawing Number : D206-667-243 REV B + DSI 9415 Rev A  
 Project Number : N/A  
 Drawing Revision : B  
 First Issue : / / Type : CROSSTUBES  
 Material :  
 Previous Run : 41392 Due Date : 05/09/2008 Qty: 1 Um: Each  
 Written By :  
 Checked & Approved By : JLD 08.8.19  
 Comment : Est Rev:F 05.09.01 Add holes for compatibility with Bell  
 Skidtubes KJ/JLM  
 Est Rev:G 08-06-03 update as per DSI9415 (ECN1198) DD  
 verified by:ec  
 Est Rev:H 08-07-18 remove thread masking in step 12 DD  
 verified by:EC

## Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description :

1.0

DC

DOCUMENT CONTROL



JLD 08.8.28



Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D206-667-203 CHG003

5 08/10/17

2.0

D206667203TRN

Crosstube Turning Detail



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

CROSSTUBE TURNING DETAIL

batch 34200

D 117-9-26

3.0

BENDING

BENDING MACHINE - SKIDTUBES



Comment: BENDING MACHINE

Bend tube as per Dwg D206-667-243 using CNC bender program 206L-AF and Folio FT

D 8-9-26

4.0

QC15

DIMENSIONAL CHECK OF X-TUBES



Comment: DIMENSIONAL CHECK OF X-TUBES

9 08.09.26

5.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube using drill Jig DT8583 &amp; DT8584 as per Dwg D206-667-243. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 &amp; DT8584 as per Dwg D206-667-243

85 08-09-29

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

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Drawing Name: 206L AFT X-TUBE

Job Number: 41393

Part Number: D206667203

Job Number:



Seq. #:

Machine Or Operation:

Description :

Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT8583 & DT8584 as per Dwg D206-667-243. Drill only the top (2) holes.

5-Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D206-667-243

6-Drill Fwd rivet holes using drill Jig DT8789FWD as per Dwg D206-667-143. Note: Fwd side has 3x top holes.

7-Drill Aft rivet holes using drill Jig DT8789 as per Dwg D206-667-243.

8-C'sink holes as per Dwg D206-667-243.

9-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D206-667-243

10-Scribe part # and batch # using vibrating stylus as per Dwg D206-667-243  
Inside of Cuff(Donot engrave on outside of tube)

8T  
08-09-29

AWM  
8-9-29

8T 08 09-29

6.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



AWM 8-9-29



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

7.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

80860230 @

8.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

80860230 @

9.0

OUTSIDE SERV.10

OUTSIDE SERVICES -skids



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038Or

Issue P/O: 7301

LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

P/O 7301 08/10/09  
08/10/02 @

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Drawing Name: 206L AFT X-TUBE

Job Number: 41393

Part Number: D206667203

Job Number:



Seq. #:

Machine Or Operation:

Description :

10.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

11.0

QC8

DIMENSIONAL CHECK



ml

08 10 09

(1)



Comment: Inspect for damage & ensure results are as per Dwg D206-667-103

12.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

ml

08 10 14

(1)

13.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

08-10-15

08.10.15 (1)

14.0

D2873045

Nut Plate Assembly



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2873-045

Nut Plate

37942

ml

08 10 16

15.0

D2873043

Nut Plate Assembly



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2873-043

Nut Plate

37769

ml

08 10 16

16.0

MS20601AD4W10

RIVET



Comment: Qty.: 14.0000 Each(s)/Unit Total : 14.0000 Each(s)

Pick:

Qty Part number Description Batch

14 MS20601AD4W10 Rivet

108673

ml

08 10 16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Job Number: 41393

Part Number: D206667203

Job Number:



Seq. #:

Machine Or Operation:

Description :

17.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install nut plates as per Dwg D206-667-243.

ml 08 10 16

18.0

D3595075450

RUBBER CUSHION .75" x 4.50



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

RUBBER CUSHION .75" x 4.50

40221

ml 08 10 16

19.0

D28921

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number

Description Batch

2 D2892-1

Support

37654

ml 08 10 16

20.0

MS2192022

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number

Description Batch

4 MS21920-22

Clamp

107356

ml 08 10 16

21.0

SKIDTUBES 1

SKIDTUBESS RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Magnabond 108966 exp: 10/2009

1-Install abrasion strips as per QSI 035 using DT8580. Note: (3) top holes should be facing up.

2-Install supports and clamps as per Dwg D206-667-243. Torque clamps to 80-100 in lb.

1008-10-17

ml 08 10 16 (1)

22.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

S 08/10/17 @

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Job Number: 41393

Part Number: D206667203

Job Number:



Seq. #:

Machine Or Operation:

Description :

23.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

24.0

AN534A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Bolt

Batch: M107013

25.0

MS21042L5

Nut



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Nut

Batch: M128161

26.0

AN510A

Bolt



Comment: Qty.: 10.0000 Each(s)/Unit Total: 10.0000 Each(s)

Pick:Packing Kit

Qty Part number

Description Batch

10 AN5-10A

Bolt M108990

27.0

AN532A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Pick:Packing Kit

Qty Part number

Description Batch

4 AN5-32A

Bolt M107013

28.0

AN960JD516

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total: 18.0000 Each(s)

Pick:Packing Kit

Qty Part number

Description Batch

18 AN960JD516

Washer M109009

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 206L AFT X-TUBE

Job Number: 41393

Part Number: D206667203

Job Number:



Seq. #:

Machine Or Operation:

Description :

29.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

SS 08/10/17 @

30.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D206-667-203

Location: \_\_\_\_\_

PPP Rev: \_\_\_\_\_

Rev D

SS 08/10/17 @

31.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08/10/2009

Job Completion



MF 08-10-17

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

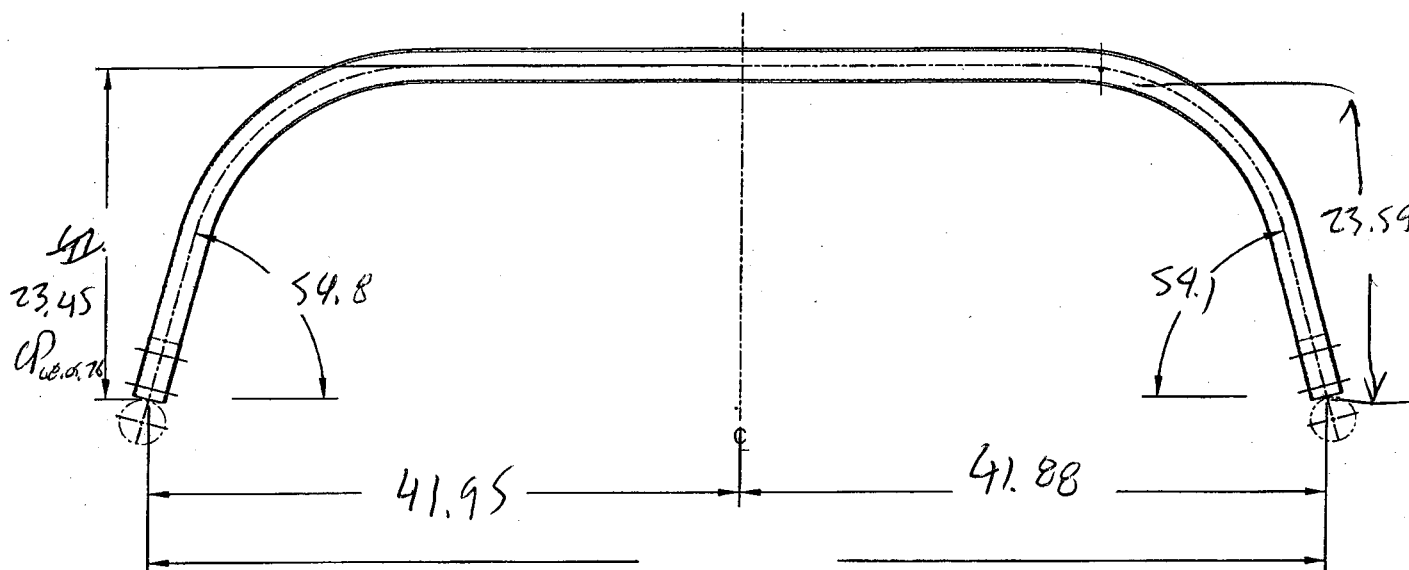
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DART AEROSPACE LTD		Work Order:	41393
Description: Crosstube High Aft (206L)		Part Number:	D206-667-203
Inspection Dwg: D206-667-243 Rev: B		Page 1 of 1	

Required Dimension	Min	Max
Height	23.46	23.58
1/2 Span	41.86	41.98
Angle	54	56
Total Span	83.72	83.96



Comments
Tube 0.010" Short on one <del>height</del> height. Acceptable P. 08.05.26

QC15 Inspection	08.05.26
Date	P.

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	P.

**DART**

DESIGN PH	DRAWN BY PH	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED # DS	APPROVED # DS	DRAWING NO. D206-667-243	REV. B SHEET 1 OF 3
DATE 05.07.26		TITLE CROSSTUBE ASS'Y (206L HIGH AFT)	SCALE NTS
A	00.11.17	NEW ISSUE	
B	05.07.26	ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	

RELEASED  
05-07-26 -H**UNDER REVIEW**  
06.08.10 PH  
re draw detail F  
PH 01.03.20

Qty	Part Number	Description
X	D206-667-243	CROSSTUBE ASSEMBLY
1	D6004-115	CROSSTUBE
2	D2856-400-773	ABRASION STRIP
2	D2873-043	NUT PLATE
2	D2873-045	NUT PLATE
2	D2892-1	SUPPORT
14	MS20601AD4W10	RIVET (OR NAS9302B-4-10)
4	MS21920-22	CLAMP

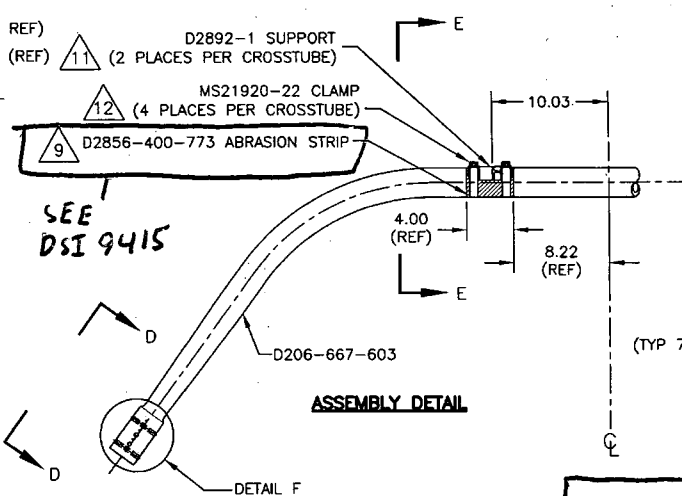
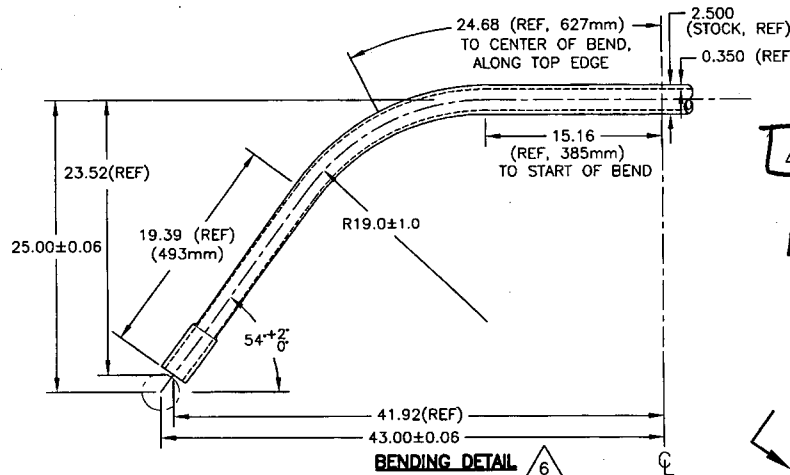
DSI 9415

**GENERAL NOTES:**

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6004-115  
FINISHED LENGTH =  $104.91 \pm 0.020$
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D2892-1 SUPPORT, PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) IT IS OPTIONAL TO SEAL EDGES OF SUPPORTS AND ABRASION STRIP USING SIKAFLEX-241/291 SEALANT.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

ON INSIDE  
OF LUFF  
SHOP COPY  
RETURN TO  
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WORK ORDER  
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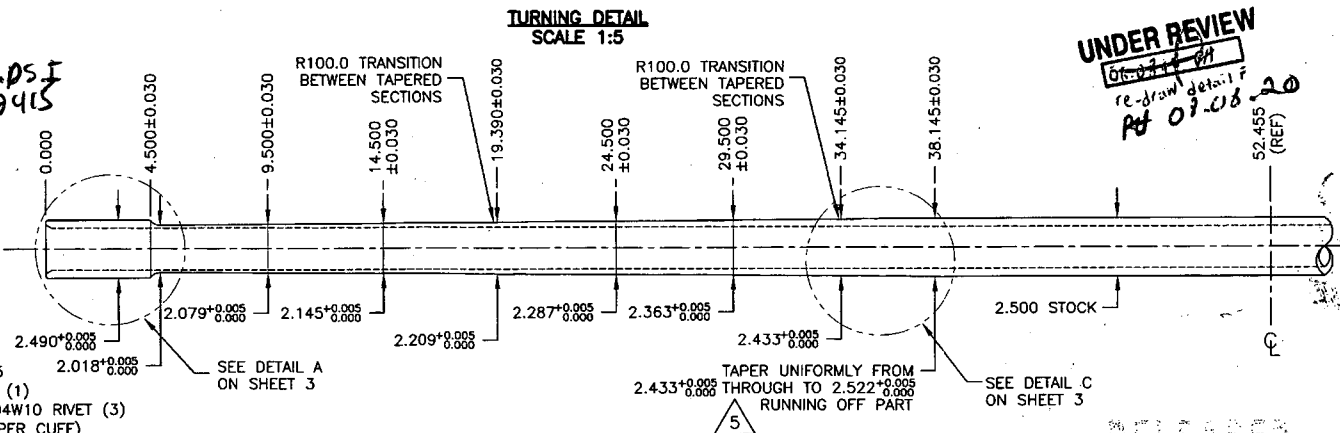
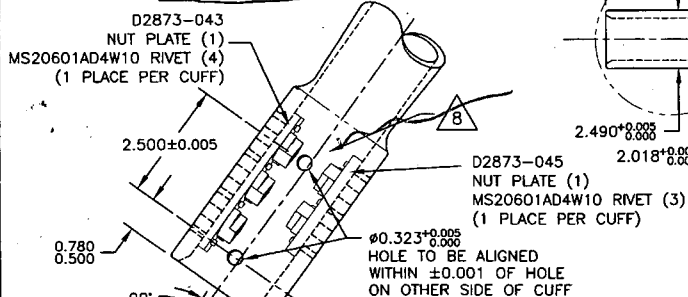
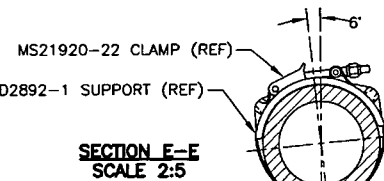
B  $\phi 0.323^{+0.005}_{-0.000}$   
(TYP 5 PLACES PER CUFF)  
HOLE TO BE ALIGNED WITHIN  $\pm 0.001$   
OF HOLE ON OTHER SIDE OF CUFF

PILOT  $\phi 0.128$   
C'SINK  $\phi 0.225 \times 100'$   
(TYP 7 PLACES PER CUFF)

FWD SIDE ONLY

DETAIL F  
SCALE 2:5

**UNDER REVIEW**  
06-07-24 PH  
re-draw detail F  
# 07-08-20

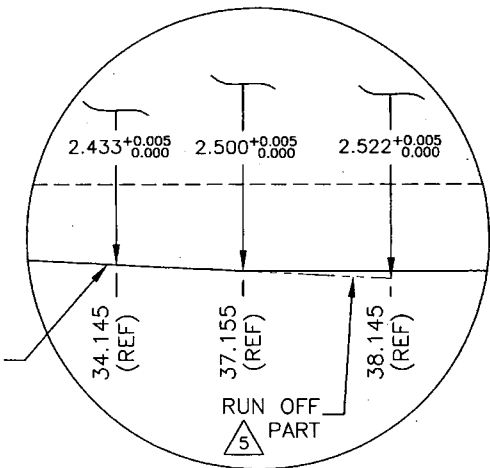
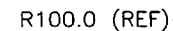
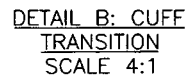
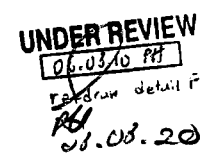


RELEASED  
05-07-26 #

COPYRIGHT © 2000 BY DART AEROSPACE LTD.		DESIGN PH	DRAWN BY PH	<b>DART</b> DART AEROSPACE LTD. MARKHAM, ONTARIO, CANADA
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		CHECKED # DS	APPROVED # DS	DRAWING NO. D206-667-243
DATE 05.07.26		TITLE CROSSTUBE ASS'Y (206L HIGH AFT)		REV. B SHEET 2 OF 3 SCALE 1:10

NO. 91893  
WORK ORDER  
WITHOUT NOTICE  
SUBJECT TO AMENDMENT  
UNCONTROLLED COPY  
ENGINEERING  
SHO COPY  
FOR REVIEW TO

05-07-26



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DESIGN	PH
CHECKED	<del>DS</del>
DATE	05.07.26

DRAWN BY	PH
APPROVED	<del>PH</del> DS

DRAWING NO. .  
D206-667-243

REV. 8

**SHEET 3 OF 3**

SCALE

TITLE	CROSSTUBE ASS'Y (206L HIGH AFT)
-------	---------------------------------

1:1 |

SMOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 41393



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SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 41393

## DART SERVICE INSTRUCTION

TO AMEND INSTALLATION INSTRUCTIONS IIN-D206-667 REV. C AND  
INSTRUCTIONS FOR CONTINUED AIRWORTHINESS ICA-D206-667 REV. 2  
REF: CANADIAN STC: SH01-5  
REF: FAA STC: SR01304NY

For D206-667-101/-201/-103/-203 or D407-667-105 cross tubes at CHG 003 or later, the D2856-400-694/-773 abrasion strip has been removed, the center D2891-1 or D2892-1 support has been bonded onto the crosstube using Magnabond 6398 and D3595-075-395/-450 Rubber Cushions have been installed underneath the MS21920-20/-22 Clamps. Amend parts list of the IIN-D206-667 section 5 and ICA-D206-667 Section 32.8 as follows:

### REMOVE:

ITEM	QTY -101	QTY -201	QTY -103	QTY -203	QTY -105	PART NUMBER	DESCRIPTION
13	2	2	2		2	D2856-400-694	ABRASION STRIP
14				2		D2856-400-773	ABRASION STRIP

### ADD:

ITEM	QTY -101	QTY -201	QTY -103	QTY -203	QTY -105	PART NUMBER	DESCRIPTION
24	4	4	4		4	D3595-075-395	RUBBER CUSHION
25				4		D3595-075-450	RUBBER CUSHION

To prevent the supports from shifting on the D206-667-101/-201/-103/-203 or D407-667-105 crosstubes at CHG 002 or earlier, the D2891-1/D2892-1 supports should be removed and re-installed as follows:

- 1) Follow section 32.1 of ICA-D206-667 for the removal of the crosstubes from the helicopter.
- 2) Remove the qty (2) MS21920-20/-22 clamps from the crosstube that fasten the D2891-1/D2892-1 supports to the crosstube.
- 3) Remove the D2856-400-694/-773 abrasion strip from the crosstube per section 32.5 of ICA-D206-667.
- 4) Inspect the crosstube surface underneath the support for corrosion and mechanical damage per items 5.3.1 and 5.3.2 of the 300 hour inspection of ICA-D206-667. Repair damage within acceptable limits per item 5.3.3 of the 300 hour inspection in ICA-D206-667. Touch up finish per item 5.3.9 of the 300 hour inspection.
- 5) Abrade area to which support will be applied with 400 grit sandpaper. Saturate a clean cloth with MEK or 4105S Wash'n'Wipe Degreaser or equivalent and wipe area until there is no residue.
- 6) Apply a 0.03" to 0.06" thick layer of Magnabond 6398 underneath the D2891-1/D2892-1 support and re-install the support on the crosstube as shown in Figure 1. Position and secure the D2891-1/D2892-1 support on the crosstube using MS21920-20/-22 Clamps. Install a D3595-075-395/-450 Rubber cushion underneath each MS21920-20/-22 Clamp. Torque clamps 80-100 in-lb. Let the D206-667-101/-201/-103/-203 or D412-667-105 crosstube assembly cure as per the Magnabond 6398 instructions before re-installing the crosstube on the aircraft.

CANADA  
DEPARTMENT OF TRANSPORT  
AIRCRAFT CERTIFICATION  
BRANCH  
DAO # 01-O-01

### APPROVED

BY: [Signature]  
D. SHEPHERD (DE # 02)

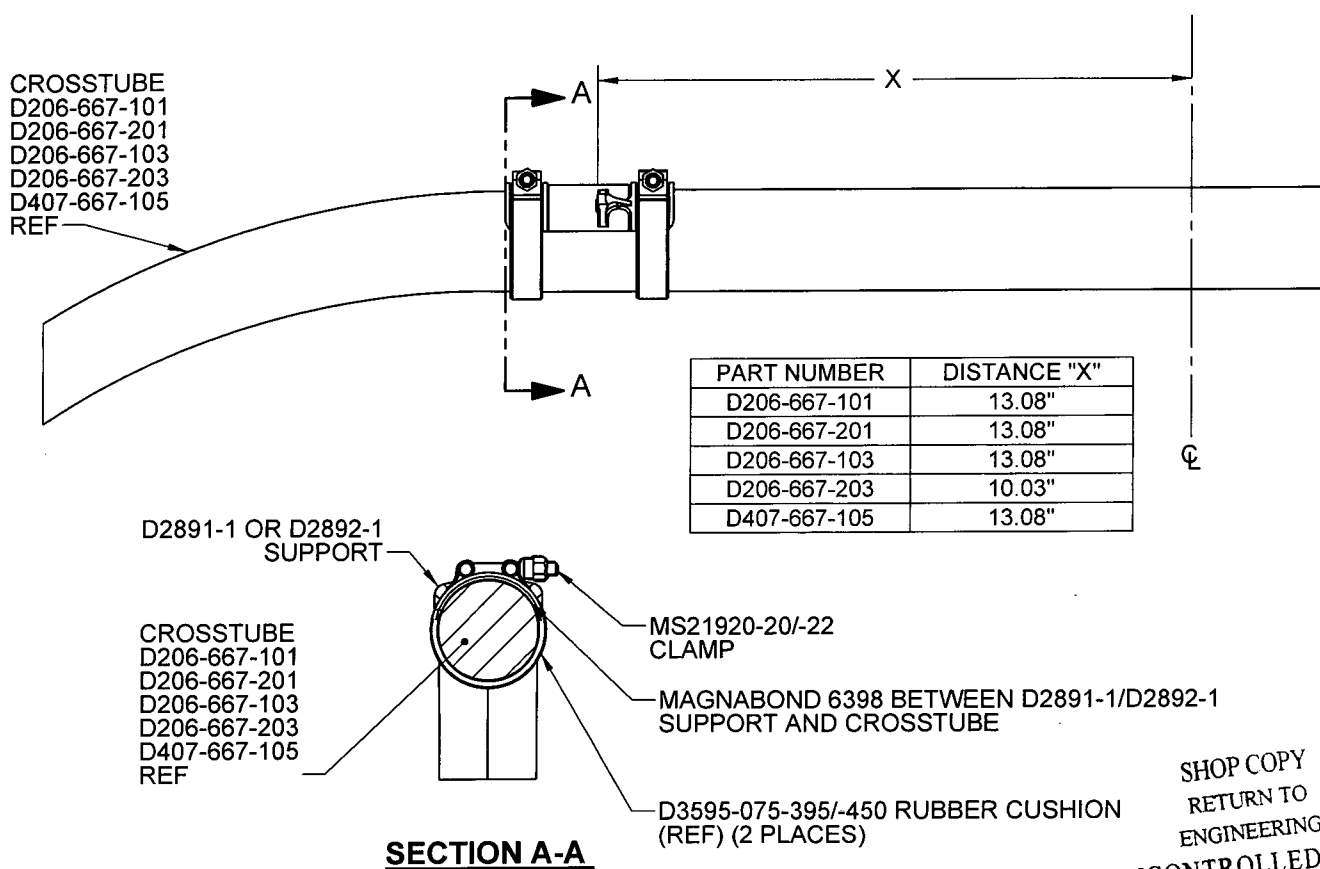
DATE: 08.05.26  
CERT. NO.: SH01-5  
ISSUE NO.: 3

A	NEW ISSUE	HS	08.05.26
REV.	DESCRIPTION	BY	DATE
DESIGN	HS	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	HS		
CHECKED	PH	DRAWING NO.	REV. A
MFG. APPR.	[Signature]	DSI 9415	SHEET 1 OF 2
APPROVED	[Signature]	TITLE	SCALE
DE APPR.	[Signature]	CROSSTUBE SUPPORT CHANGE	NTS
DATE	08.05.26	COPYRIGHT © 2008 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

7) Re-install the D206-667-101/-201/-103/-203 or D412-667-105 crosstube per section 32.2 of ICA-D206-667.

For customers who would like to upgrade their D206-667-101/-201/-103/-203 or D412-667-105 crosstubes from CHG 002 or earlier to CHG 003, the following kit can be obtained from Dart:

QTY -011	QTY -013	PART NUMBER	DESCRIPTION
X		DSI 9415-011	CROSSTUBE SUPPORT CHANGE (USABLE ON D206-667-101/-201/-103 OR D407-667-105)
	X	DSI 9415-013	CROSSTUBE SUPPORT CHANGE (USABLE ON D206-667-203)
4		D3595-075-395	RUBBER CUSHION
	4	D3595-075-450	RUBBER CUSHION



**FIGURE 1 - CROSSTUBE SUPPORT**

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 41393

CANADA  
DEPARTMENT OF TRANSPORT  
AIRCRAFT CERTIFICATION  
BRANCH  
DAO # 01-O-01

**APPROVED**

BY: D. Shepherd  
D. SHEPHERD (DE # 02)

DATE: 08.05.26  
CERT. NO.: SH01-5  
ISSUE NO.: 3

DESIGN	HS	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	HS		
CHECKED	PH	DRAWING NO.	REV. A
MFG. APPR.	B	DSI 9415	SHEET 2 OF 2
APPROVED	UP	TITLE	SCALE
DE APPR.	#	CROSSTUBE SUPPORT CHANGE	NTS
DATE	08.05.26	COPYRIGHT © 2008 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	





## NONDESTRUCTIVE TESTING REPORT

N- 10406

PAGE 1 OF 1

CLIENT DART AEROSPACE DATE 09/22/08 TIME ☒ AM ☐ PM  
ATTENTION LINDA LACELLE ACUREN JOB NO. 188-08-1533  
ADDRESS 1270 ABERDEEN ST. PO/WO NO. 7301  
HAWKES BURY CNT. WORK LOCATION SHOP - SAME ADDRESS  
PROJECT 8 LPI. CROSS TUBES ACCEPTANCE STD. BTM 1417/OSI-038 REV./DATE  
ITEM(S) EXAMINED SIX - CROSS TUBES.  
JOB # PART - (41393, 41394, 42063, 42064, 42282, 42283).

## JOB DESCRIPTION

PART NO. MATERIAL ALUMINUM THICKNESS  
SCOPE WET FLUORESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE - \* NOTE: INDICATIONS, PC ON CHATTEL/D4.590" UP FROM THE END OF THE CUFF. 2" RADIUS ON BOTH ENDS/41394.

LIQUID PENETRANT TESTING PROCEDURE NO. LT-XXXX REV./DATE TECHNIQUE NO. LT-XXXX-XXX REV./DATE  
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 8171 ☐ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT < 2 fc  
PENETRANT 2L07 MINIMUM DWELL TIME 10 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER CAL FEB 12-08  
DEVELOPER MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N CAL DUE DATE  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY  
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < -4°C/20°F ☐ -4°C/20°F TO 10°C/50°F ☐ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

MAGNETIC PARTICLE TESTING PROCEDURE NO. MT-XXXX REV./DATE TECHNIQUE NO. MT-XXXX-XXX REV./DATE  
METHOD ☐ DRY ☐ WET ☐ FLUORESCENT ☐ NON FLUORESCENT ☐ YOKE ☐ COIL ☐ HEAD ☐ CONDUCTOR BAR  
PARTICLE BRAND PRODUCT NO. CURRENT ☐ AC ☐ DC EFF. CURRENT AMPS:  
PARTICLE COLOUR ☐ GREY ☐ RED ☐ BLACK ☐ OTHER MT INSTRUMENT S/N CAL DUE  
SUSPENSION ☐ WATER ☐ OIL ☐ NOT APPLICABLE BLACK LIGHT S/N ☐ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT < 2 fc  
CONTRAST PAINT PRODUCT NO. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100fc @ SURFACE  
MAG. TIME SECONDS DEMAG. REQUIRED? ☐ Yes ☐ No LIGHT METER S/N CAL DUE  
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☐ CLEAN BARE METAL ☐ COATED  
THE TECHNIQUE HAS BEEN DEMONSTRATED OVER A COATED SURFACE? ☐ YES ☐ N/A THICKNESS: TYPE OF COATING:  
SURFACE TEMPERATURE ☐ < 57°C/135°F ☐ 57°C/135°F TO 316°C/600°F ☐ > 316°C/600°F

ULTRASONIC TESTING PROCEDURE NO. UT-XXXX REV./DATE TECHNIQUE NO. UT-XXXX-XXX REV./DATE  
METHOD ☐ THICKNESS ☐ FLAW DETECTION ☐ CONTACT ☐ IMMERSION  
INSTRUMENT MODEL S/N CAL. DUE DATE  
CAL. BLOCK S/N CABLE - TYPE Coaxial - \_\_\_\_\_ to \_\_\_\_\_ LENGTH  
CAL. BLOCK S/N COUPLANT  
CAL. BLOCK S/N SPECIAL EQUIP.

## INFORMATION - TRANSDUCERS &amp; CALIBRATIONS -

TEST ANGLE	PROBE TYPE		MAKE	FREQ.	SER. NO.	PROBE DIA.	TRANSFER VALUE	TEST FROM FACE	REFERENCE REFLECTOR	REFERENCE		SCAN SENSITIVITY	RANGE
	SINGLE	DUAL								dB	% FSH		
1 <input type="checkbox"/> 0°	<input type="checkbox"/>	<input type="checkbox"/>											
2 <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
3 <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											

## TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☐ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < 0°C/32°F ☐ 0°C/32°F TO 120°C/250°F ☐ 120°C/250°F TO 260°C/500°F ☐ > 260°C/500°F

Scope of Services  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacturing, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.  
Standard of Care  
In performing the services provided, Acuren Group Inc. uses the degree of care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

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# LIQUID PENETRANT TEST REPORT

P- 09127

PAGE 1 OF 1  
TIME AM ☐ PM ☐

CLIENT

ATTENTION

ADDRESS

PROJECT

ITEM(S) EXAMINED

DATE

ACUREN JOB NO.

PO/NO.

WORK LOCATION

ACCEPTANCE STD.

REV./DATE

JOB DESCRIPTION

PROCEDURE NO. LT-XXXX REV./DATE

TECHNIQUE NO. LT-XXXX-XXX REV./DATE

PART NO.

SCOPE

THICKNESS

## TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND			BLACK LIGHT S/N	<input checked="" type="checkbox"/> OUTPUT > 1000 $\mu$ W/cm <sup>2</sup>	<input type="checkbox"/> AMBIENT < 2 fc
PENETRANT	20 mm	MINIMUM DWELL TIME	30 MIN.	LIGHTING EQUIP. <input checked="" type="checkbox"/> FLASHLIGHT	<input type="checkbox"/> TROUBLELIGHT
PENETRANT REMOVER		MINIMUM DRY TIME	>10 MIN.	OTHER	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
DEVELOPER		MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	8171
DEVELOPER TYPE	<input type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY N/A	CAL DUE DATE Jan 12/09	

## TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input checked="" type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < - 4°C/ 20°F	<input type="checkbox"/> - 4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

## RESULTS- ( ☐ METRIC ☐ IMPERIAL )

ITEM	COMMENTS	ACCEPT	REJECT
41394	ACCEPTABLE		
41393	ACCEPTABLE		
42296	ACCEPTABLE		
42297	ACCEPTABLE		
42061	ACCEPTABLE		
42062	ACCEPTABLE		

**Scope of Services**  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

### Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE

TECHNICIAN (SIGNATURE):

NAME (PRINT):

DTR #

REPORT

REVIEWED BY:

NAME

INITIALS

1<sup>ST</sup> TECHNICIAN

2<sup>ND</sup> TECHNICIAN

CGSB LEVEL IF SNT LEVEL

CGSB LEVEL SNT LEVEL

CGSB REG. No 10560

CGSB REG. No

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PT Sept 2005

EXCERPT FROM SR-D206-667-2 Rev. A  
FOR D206-667-243 AFT XTUBE

SECTION	Cross tube	Damage Tolerance	O.D. (in)	I.D. (in)	Area (in <sup>2</sup> )	Inertia (in <sup>4</sup> )
A-A	Bell Aft	0.000	2.500	1.820	2.307	1.379
	Bell Aft w/ dam. tol.	0.005			2.302	1.371
	Dart Aft	0.000	2.500	1.800	2.364	1.402
	Dart Aft w/ dam. tol.	0.015			2.246	1.332
B-B	Bell Aft	0.000	2.422	1.820	2.006	1.151
	Bell Aft w/ dam. tol.	0.005			2.001	1.143
	Dart Aft	0.000	2.413	1.800	2.028	1.149
	Dart Aft w/ dam. tol.	0.015			1.911	1.080
C-C	Bell Aft	0.000	2.357	1.820	1.762	0.976
	Bell Aft w/ dam. tol.	0.005			1.757	0.969
	Dart Aft	-0.014	2.331	1.800	1.723	0.934
	Dart Aft w/ dam. tol.	0.015			1.605	0.866
D-D	Bell Aft	0.000	2.291	1.820	1.521	0.814
	Bell Aft w/ dam. tol.	0.005			1.516	0.807
	Dart Aft	-0.014	2.263	1.800	1.477	0.772
	Dart Aft w/ dam. tol.	0.015			1.360	0.706
E-E	Bell Aft	0.000	2.226	1.820	1.290	0.667
	Bell Aft w/ dam. tol.	0.005			1.285	0.660
	Dart Aft	-0.014	2.195	1.800	1.239	0.624
	Dart Aft w/ dam. tol.	0.015			1.122	0.559
F-F	Bell Aft	0.000	2.117	1.820	0.918	0.447
	Bell Aft w/ dam. tol.	0.005			0.913	0.442
	Dart Aft	-0.014	2.099	1.800	0.916	0.438
	Dart Aft w/ dam. tol.	0.015			0.815	0.374
G-G	Bell Aft	0.000	2.008	1.820	0.565	0.259
	Bell Aft w/ dam. tol.	0.005			0.560	0.254
	Dart Aft	0.000	2.018	1.800	0.654	0.299
	Dart Aft w/ dam. tol.	0.015			0.553	0.236
H-H	Bell Aft	0.000	2.500	1.820	2.307	1.379
	Bell Aft w/ dam. tol.	0.005			2.302	1.371
	Dart Aft	0.000	2.490	1.800	2.325	1.372
	Dart Aft w/ dam. tol.	0.030			2.192	1.301

REDUCE BY 0.014"

SECTION **	Cross tube	Bending Ultimate (lb*in)	Bending Yield (lb*in)	Tension Ultimate (lb)	Tension Yield (lb)	Shear Ultimate (lb)
A-A	Bell aft w/ DT	72393	61424	151944	128922	96692
	Dart aft w/ DT	82041	70745	172963	148254	92097
	Margin of Safety	0.13	0.15	0.14	0.15	-0.05
B-B	Bell aft w/ DT	62306	52866	132043	112037	84028
	Dart aft w/ DT	68918	59442	147114	126097	78333
	Margin of Safety	0.11	0.12	0.11	0.13	-0.07
C-C	Bell aft w/ DT	54293	46067	115941	98374	73781
	Dart aft w/ DT	57238	49379	123588	105933	65807
	Margin of Safety	0.054	0.07	0.07	0.08	-0.11
D-D	Bell aft w/ DT	46505	39459	100040	84882	63662
	Dart aft w/ DT	48024	41438	104696	89740	55747
	Margin of Safety	0.033	0.05	0.05	0.06	-0.12
E-E	Bell aft w/ DT	39164	33230	84820	71969	53976
	Dart aft w/ DT	39215	33844	86363	74026	45986
	Margin of Safety	0.001	0.02	0.02	0.03	-0.15
F-F	Bell aft w/ DT	27545	23371	60282	51148	38361
	Dart aft w/ DT	27428	23679	62762	53796	33419
	Margin of Safety	-0.004	0.01	0.04	0.05	-0.13
G-G	Bell aft w/ DT	16724	14190	36975	31372	23529
	Dart aft w/ DT	18033	15573	42595	36510	22680
	Margin of Safety	0.08	0.10	0.15	0.16	-0.04
H-H	Bell fwd w/ DT	72393	61424	151944	128922	96692
	Dart fwd w/ DT	80479	69400	168790	144677	89875
	Margin of Safety	0.11	0.13	0.11	0.12	-0.07

01) REDUCED BY 0.014" FOR SECTIONS C-C through F-F. MARGINS POSITIVE, EXCEPT FOR ULT. BENDING OF F-F. HOWEVER, TUBE WILL FAIL IN BENDING AT A-A BEFORE F-F.

ALLOWABLE BENDING / DISTANCE TO SECTION FROM SKID = ALLOWABLE LOAD AT SKID TUBE.

A-A:  $82041 / 32.97" = 2488 \text{ lb}$   
 F-F:  $27428 / 9.892" = 2771 \text{ lb}$   
 MS =  $\frac{2771}{2488} - 1 = 0.11$

OK

08.10.14